CLAIMS

What is claimed is:

1. A method of assembling a head gimbal assembly, comprising the steps of:

stacking a base plate, a load beam, and a flexure to form a three-layered stacked series with at least a bottom layer being a base plate series;

joining at least predetermined portions of the load beam to the base plate, and the flexure to the load beam in the three-layered stacked series to make a suspension section, thereby forming a suspension series that comprises suspension sections;

attaching a slider to the flexure in the suspension section of the suspension series to make a head gimbal assembly, thereby forming a HG assembly series that comprises head gimbal assemblies;

electrically connecting terminals to leads, the terminals connecting to a head of the slider of the HG assembly series, the leads being disposed on the flexure and electrically connected outside the HG assembly; and

load-bending a hinge portion formed in the head gimbal assembly of the HG assembly series.

2. The method of claim 1, further comprising a bending-load adjusting step of:

heating the hinge portion after performing the load-bending step, to adjust a bending load on the hinge portion at a predetermined bending angle to a predetermined value.

3. The method of claim 1, wherein the stacking step comprises stacking the flexure on a two-layered stacked series including the base plate series and a load beam series that comprises load beams formed in a series manner, thereby forming the three-layered stacked series.

4. The method of claim 3, wherein when the flexure is stacked, leading ends of projecting limiters formed in the flexure are passed through an opening formed in the load beam and then disposed on opposite sides of the opening.

5. The method of claim 1, wherein the stacking and joining steps comprise performing the joining by spot-welding that employs laser radiation.

6. The method of claim 1, wherein the slider attaching step comprises applying an adhesive to an attaching surface of the slider for temporary placement of the slider near a predetermined position of the flexure, and

wherein in the electrical connection step, the slider is accurately positioned in the predetermined position of the flexure.

7. The method of claim 1, wherein in the electrical connection step, the head gimbal assembly of the HG assembly series is inclined with respect to a horizontal direction without undergoing plastic deformation, a solder ball is disposed in contact with a bonding pad in the slider and a lead pad formed at an edge of the lead, and then the solder ball is heated to be melted, thereby forming a solder joint therebetween to perform the electrical connection.

8. The method of claim 2, wherein the load-bending step comprises:

forming a bending angle not less than the predetermined bending angle;

sensing a bending load when the predetermined bending angle has been recovered; and

radiating a laser beam to the hinge portion to make the adjustment.

9. A head gimbal assembly assembling apparatus, comprising:

stacking means for stacking a base plate, a load beam, and a flexure to form a three-layered stacked series with at least the bottom layer being a base plate series, the base plate series comprising base plates formed in a series manner;

first transfer means for transferring the three-layered stacked series intermittently in a state in which the base plate, the load beam, and the flexure mutually maintain predetermined positional relationships;

stacking-and-joining means for stacking and joining at least predetermined portions of the load beam to the base plate, and the flexure to the load beam to make a suspension section, thereby forming a suspension series while the three-layered stacked series transferred by the first transfer means is in a state of rest;

second transfer means for functioning on at least the base plate series of the suspension series to transfer the suspension series, in synchronization with the first transfer means;

slider attaching means for attaching a slider to the flexure of the suspension series that is at rest in a predetermined position after having been transferred by the second transfer means to form a head gimbal assembly, thereby forming an HG assembly series;

third transfer means for functioning on at least the base plate series of the HG assembly series to transfer the HG assembly series, in synchronization with the first transfer means; and

load-bending means for bending a hinge portion formed in the head gimbal assembly of the HG assembly series by a predetermined angle while the HG assembly series is at rest in a predetermined position after having been transferred by the third transfer means.

10. The apparatus of claim 9, wherein the stacking means comprises:

a first transfer portion for intermittently transferring a two-layered stacked series formed by stacking a load beam series on the base plate series, the load beam series

comprising the load beams formed in a series manner;

a second transfer portion for intermittently transferring a flexure series in synchronization with the first transfer portion, the flexure series comprising the flexures formed in a series manner;

a cutting device for separating from the flexure series a flexure piece in which the flexure and a flexure frame are integrally formed; and

a transferring device for placing the separated flexure piece on the load beam of the two-layered stacked series.

11. The apparatus of claim 10, wherein the transferring device rotates a transferring arm having at an end thereof a sucking pad for sucking the frame of the flexure piece; and wherein

the sucking pad is made to be slightly displaceable in a direction of an axis of rotation such that leading ends of projecting limiters formed in the flexure are passed through an opening formed in the load beam and then disposed on opposite sides of the opening.

12. The apparatus of claim 10, wherein the base plate series comprises:

a first band portion having first conveying holes formed at a predetermined pitch in a longitudinal direction; and

a plurality of the base plates disposed via connecting portions integrally formed at edges on one side of the first band portion at a predetermined series pitch; and wherein the load beam series comprises:

a second band portion having second conveying holes formed at the predetermined pitch in the longitudinal direction; and

a plurality of the load beams disposed via connecting portions integrally formed at edges on one side of the second band portion at the predetermined series pitch.

13. The apparatus of claim 12, wherein the first transfer portion comprises:

first conveying pins for repeating a cyclic motion of being inserted into the first and second conveying holes at an insertion position in a conveying direction, integrally conveying the base plate series with the load beam series from the insertion position to a release position separated by the series pitch in the conveying direction, separating from the first and second conveying holes, and then returning to the insertion position; and

suppression pins to be inserted into the first and second conveying holes in synchronization with separation of the first conveying pins from the first and second conveying holes, for positioning the base plate series and the load beam series.

14. The apparatus of claim 13, wherein the first transfer means comprises:

a third transfer portion having a same configuration as the first transfer portion;

second conveying pins to be inserted into third conveying holes formed in the frame of the flexure piece, for integrally conveying the flexure piece with the load beam by a cyclic motion, in synchronization with the first conveying pins; and

a placing portion having suction openings for sucking predetermined spots of the flexure piece in synchronization with separation of the second conveying pins from the third conveying holes.

15. The apparatus of claim 9, wherein the slider attaching means comprises:

a table unit for intermittently rotating a table through a 1/n of a turn in synchronization with the intermittent transference, the table including n slider-holding recesses for receiving and then holding the sliders, the slider-holding recesses being formed near edges of a top surface of the table in such positions that the table is divided into n equal parts, each of the slider-holding recesses having a through hole at the center thereof; and

an adhesive applicator disposed below a predetermined rest position for the slider-holding recesses, for applying an adhesive to the slider held in the slider-holding

recess through the through hole.

16. The apparatus of claim 9, wherein the load-bending means comprises:

a mandrel disposed in a position to face the hinge portion and having an edge rounded for guiding bending of the hinge portion; and

a pressing roller for pressing the hinge portion along the rounded edge of the mandrel.

17. The apparatus of claim 13, wherein the second and third transfer means have a same configuration as the first transfer portion.

18. A transfer system for transferring a series of members, the series of members having a band portion including conveying holes formed at a predetermined pitch in a longitudinal direction and a plurality of the members to be transferred, the members disposed via connecting portions integrally formed at edges of one side of the band portion at a predetermined series pitch, the transfer system comprising:

conveying pins for repeating a cyclic motion of being inserted into the conveying holes at an insertion position in a conveying direction, conveying the series of the members from the insertion position to a release position separated by the series pitch in the conveying direction, separating from the conveying holes, and then returning to the insertion position; and

suppression pins to be inserted into the conveying holes, for positioning the series of the members in synchronization with separation of the conveying pins from the conveying holes.

19. The transfer system of claim 18, further comprising a placing portion having suction openings for sucking the series of the members in synchronization with insertion of the suppression pins into the conveying holes.

20. A base plate structure, comprising:

a plurality of base plates in a head gimbal assembly formed by a base plate, a load beam, and a flexure disposed one atop another, wherein the base plate structure is made of a plate member stiffer than plate members for the load beam and the flexure; wherein the base plate structure comprises:

a band portion having conveying holes and positioning holes formed at a predetermined pitch respectively in a longitudinal direction; and

a plurality of the base plates disposed via connecting portions integrally formed at a predetermined pitch at edges on one side of the band portion.